Area of Operation **VIII** - Task **A**

Straight and Level Flight

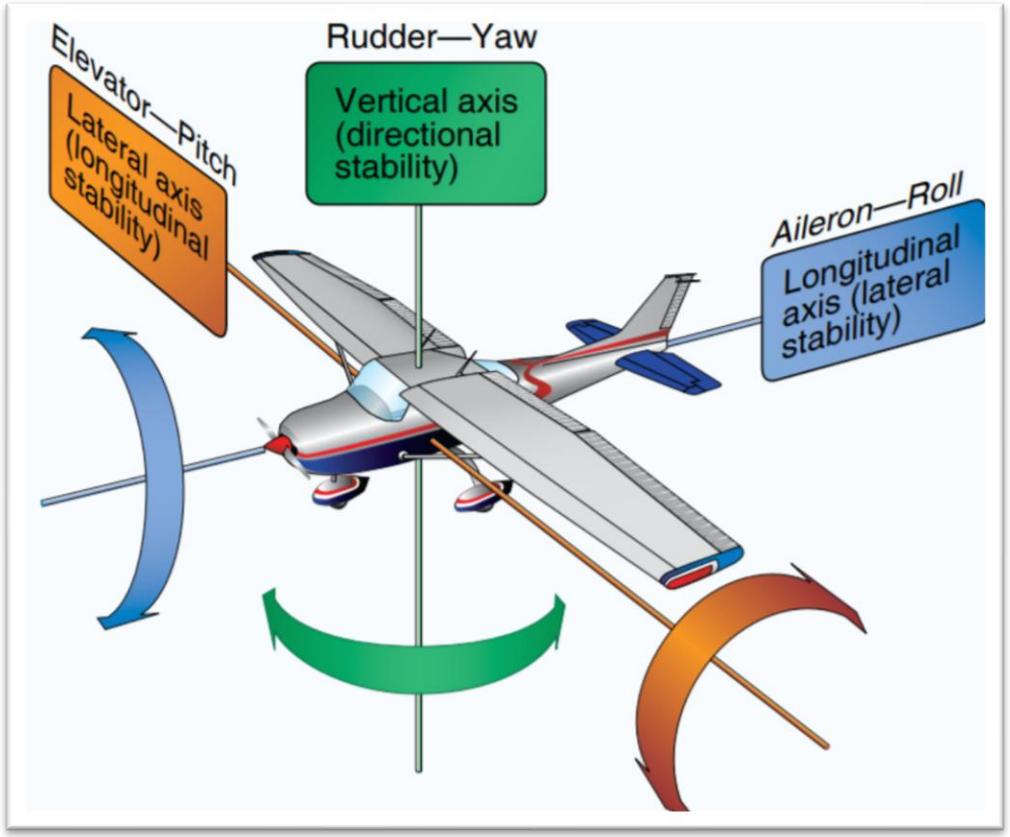
westflying

Key References:
- Airplane Flying Handbook
- Pilot's Handbook of Aeronautical Knowledge

Content

1. Introduction

- **What**: Flight in which a constant heading and altitude are maintained
- **Why**: Forming correct habits in flying straight and level using integrated method, trim and proper flight controls
- **Primary Flight Controls**:
  - Pitch – Controlled by the **Elevator** (Yoke)
    - *Back pressure pitches up*
    - *Forward pressure pitches down*
  - Roll – Controlled by the **Ailerons** (Yoke)
    - *Right roll → Right aileron deflects UP*
    - *Left roll → Left aileron deflects UP*
  - Yaw – Controlled by the **Rudder** (Pedals)
    - *Right pedal → Rudder deflects to the Right*
    - *Left pedal → Ruder deflects to the Left*



Standard (ACS):

- PPL(*): Altitude ~~**±200ft**~~ *100*, Heading **±10⁰**, Airspeed ~~**±10 kts**~~ *5*
- Traffic Pattern: Altitude **±100ft**, Airspeed **±10 kts**

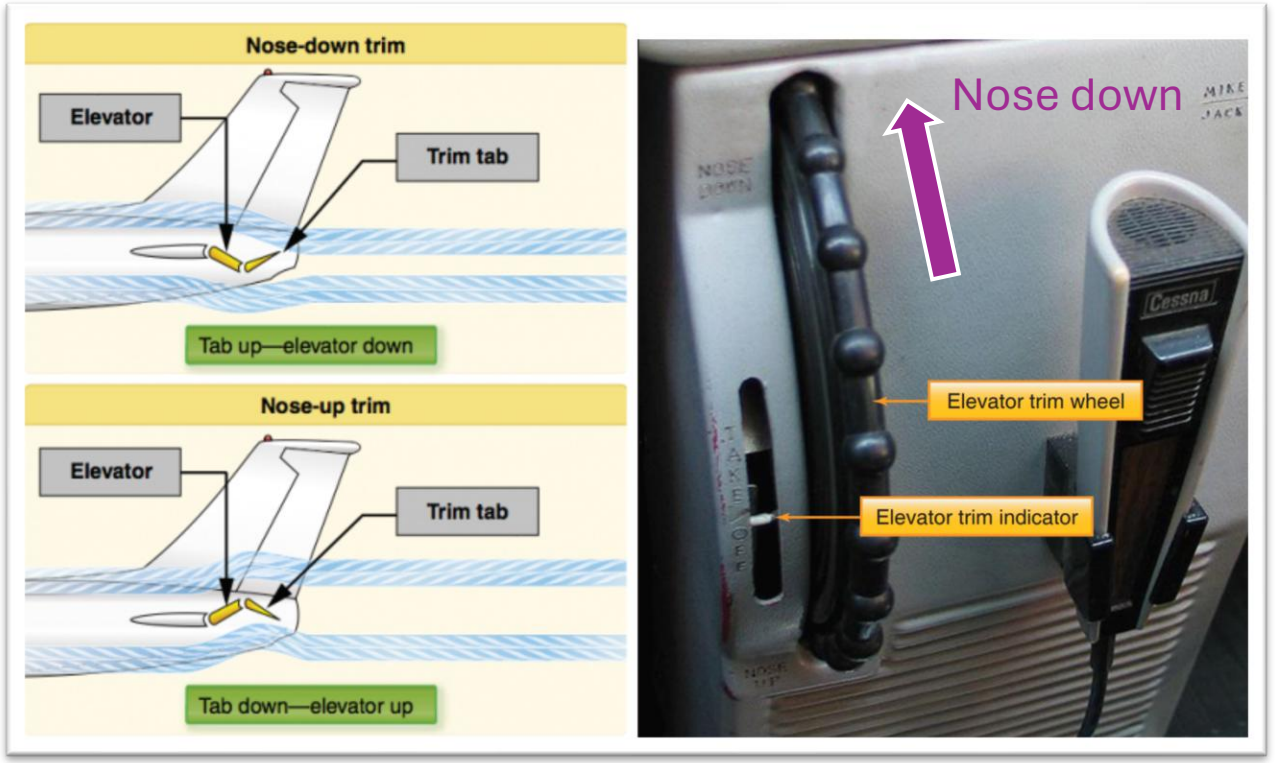
* Basic Instrument

2. Control Pressure

1. **Control should be smooth, light pressure (no jerky movements)**
    - Airplane is stable, require small control inputs → Feels more like “Guiding” versus “Piloting”
2. **Overcontrolling:**
    - White knuckle death grip (overall nervousness)
    - Large flight control movements
    - Tendency to react briskly to any natural disturbance in the aircraft movement
    - How to prevent: **fly with your fingers** and toes, deep breath, relax

3. Trim Technique

1. **Once level, set pitch and power and let airspeed stabilize**
2. **Add Trim to relieve control pressure**
   - Verify desired performance and repeat/correct it until almost no control inputs are needed
   - If multiple axis → trim Rudder first, then elevator, then aileron
   - Do not attempt to control pitch using trim, use yoke first, then add Trim to release pressure



3. Types of Trim
   - Servo: moves opposite to elevator (helps deflect the surface) → C172
   - Anti-servo: moves same direction (decrease sensitivity)

4. Integrated Flight Instruction

- Use **Outside References + Flight Instruments** to obtain and maintain desired performance
- **Basics**
  - 90% Outside, 10% Inside
  - Use outside references to fly
  - Validate the airplane's attitude and performance inside on the instruments
- **Corrections**
  - When a correction is necessary, apply it in reference to the natural horizon
  - Verify the new attitude and performance on the instruments
  - Trim the controls to maintain the new attitude and continue crosschecking

5. Flying Straight and Level

Level Flight – Elevators

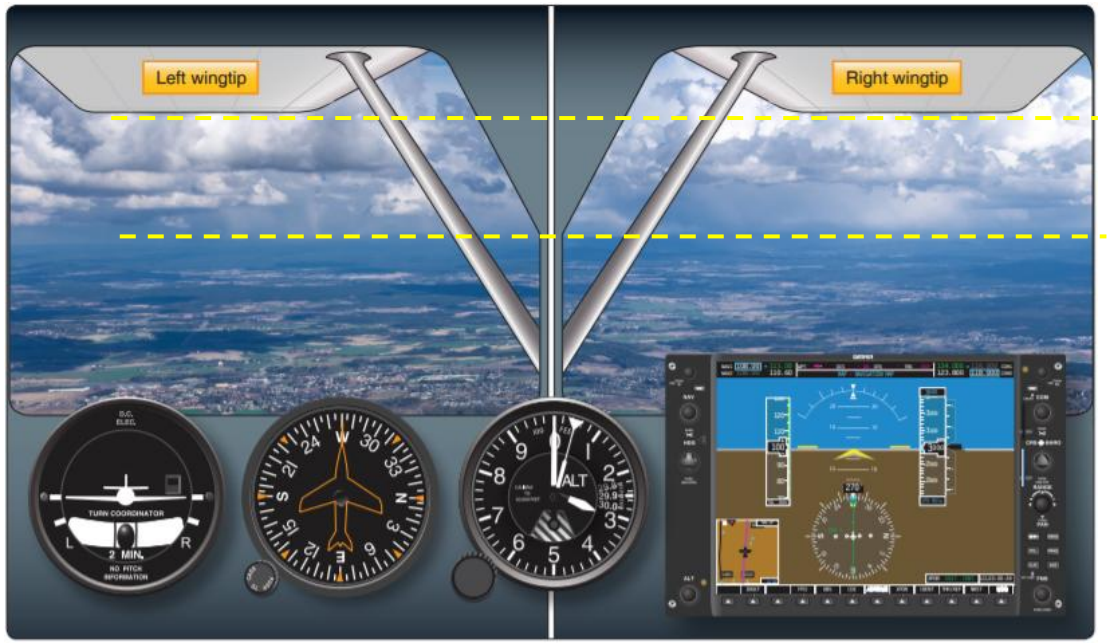
- Outside – Keep a visual reference fixed relative to the horizon
- Inside – Attitude indicator, Altimeter, VSI, and Airspeed indicator

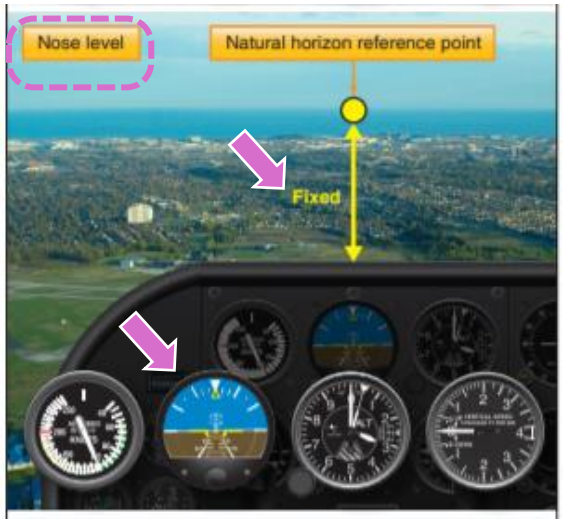
Straight Flight – Ailerons

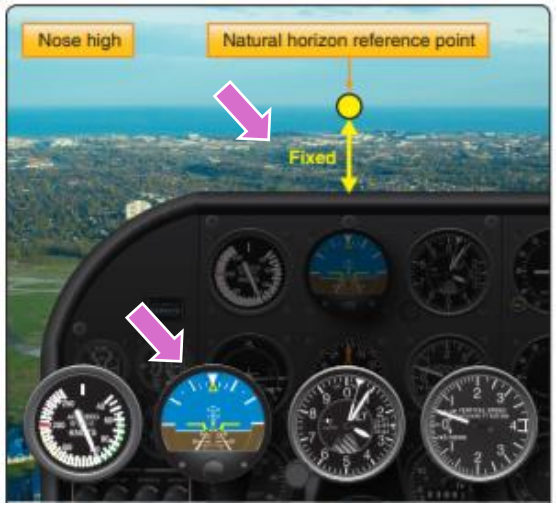
- Outside – Wingtips level and equidistant from the horizon
- Inside – Heading & Attitude Indicator, Turn Coordinator, Compass

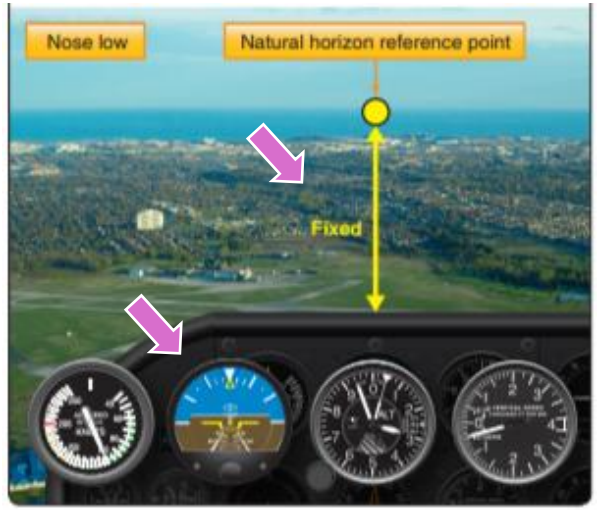
Power

- Verify with engine RPM and manifold pressure gauges.
- Also “hear” the engine:
  Higher RPM, Higher noise
- Increase speed:
  add power + lower nose
- Decrease speed:
  reduce power + raise nose









6. Common Errors

1. Failure to cross-check and correctly interpret outside and instrument references
2. Application of control movements rather than pressures
3. Uncoordinated use of flight controls
4. Faulty trim procedure

Questions?